

WHAT IS CLAIMED IS:

1. A radar apparatus for performing frequency modulation of a high-frequency signal, transmitting the
5 frequency-modulated signal, and receiving a reflected radio wave to detect a target, the radar apparatus comprising:

a high frequency generation section for generating the high-frequency signal;

a modulation signal generation section for generating
10 and giving a modulation signal to the high frequency generation section to modulate the high frequency signal;

a mixing section for mixing the high-frequency signal and the reception signal of the reflected radio wave; and

a signal processing section for controlling the
15 modulation signal generation section so as to give a modulation signal for detection changing among a plurality of predetermined signal levels and retained for a predetermined time for each signal level to the high frequency generation section, detecting frequency of a differential signal between
20 the high-frequency signal and the reception signal, inputted from the mixing section, and detecting a frequency modulation characteristic of the high frequency generation section based on the relationship between a signal level of the modulation signal for detection and the frequency of the differential
25 signal.

2. The radar apparatus according to claim 1, further comprising a modulation characteristic correction section for correcting the modulation signal based on the frequency modulation characteristic detected by the signal processing section so that the frequency modulation characteristic is not placed out of a predetermined normal range.

3. The radar apparatus according to claim 1, further comprising a width calculation section for calculating frequency modulation width, which is a difference between frequency of the differential signal when the signal level of the modulation signal is the maximum value and frequency of the differential signal when the signal level is the minimum value based on the frequency modulation characteristic detected by the signal processing section.

4. The radar apparatus according to claim 3, wherein the width calculation section includes a counter for counting the frequency of the difference.

5. The radar apparatus according to claim 3, further comprising a width correction section for correcting the modulation signal based on the frequency modulation width calculated by the width calculation section so that the

frequency modulation width has a predetermined value.

6. The radar apparatus according to claim 2, wherein one of the modulation characteristic correction section and the width correction section performs the correction when the level of the reception signal of the reflected radio wave is equal to or greater than a predetermined level.

7. The radar apparatus according to claim 2, further comprising a temperature detection section, wherein one of the modulation characteristic correction section and the width correction section performs the correction when a temperature detected by the temperature detection section has a predetermined temperature.

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8. The radar apparatus according to claim 2, wherein one of the modulation characteristic correction section and the width correction section performs the correction when a distance to the target is in a predetermined distance range.

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9. The radar apparatus according to claim 2, wherein one of the modulation characteristic correction section and the width correction section performs the correction when relative speed of the target is in a predetermined speed range.

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10. The radar apparatus according to claim 1, wherein the signal processing section detects the frequency modulation characteristic when an input level of the reflected radio wave from the target is equal to or greater than a predetermined
5 reference level at a normal radar operation time.

11. The radar apparatus according to claim 1, wherein the signal processing section detects the frequency modulation characteristic when a distance to the target is in a
10 predetermined distance range.

12. The radar apparatus according to claim 1, wherein the signal processing section detects the frequency modulation characteristic just after detecting the target initially after
15 a radar operation starts and determines whether or not a normal modulation operation for the high frequency generation section is performed. . .

13. The radar apparatus according to claim 1, further
20 comprising a reference signal source for generating a reference signal to decrease a frequency with respect to the differential signal between the high-frequency signal and the reception signal, the differential signal inputted to the signal processing section from the mixing section,
25 wherein the signal processing section detects the

frequency modulation characteristic based on the inputted differential signal with the frequency decreased by the reference signal.

5 14. The radar apparatus according to claim 13,
 wherein the reference signal source comprises:

 a basic signal generation section for generating a basic
signal, which is a source of the reference signal; and

 a frequency division section for dividing the frequency
10 of the basic signal generated from the basic signal generation
section according to one of frequency dividing ratios that can
be switched to convert the basic signal into the reference
signal.

15 15. The radar apparatus according to claim 13, wherein
the reference signal source includes a plurality of reference
signal generation sections and selects one of the reference
signal generation sections to generate the reference signal.

20 16. The radar apparatus according to claim 13, wherein
the reference signal source comprises a signal arithmetic
section for generating the reference signal by performing
arithmetic processing according to a preset program.

25 17. The radar apparatus according to claim 13, wherein

the reference signal source supplies a clock signal for a signal arithmetic processing to the signal processing section.

18. The radar apparatus according to claim 13, wherein
5 a frequency of the reference signal is set so that a difference from the frequency of the reception signal from the target is within a beat signal band at a time of a radar operation.

19. The radar apparatus according to claim 18, wherein
10 the signal processing section performs at least a part of processing of the beat signal.

20. The radar apparatus according to claim 1, wherein
the signal processing section changes a predetermined time for
15 holding a signal level of the modulation signal for detection in response to a distance to the target.

21. The radar apparatus according to claim 1, wherein
the signal processing section changes a predetermined time for
20 holding a signal level of the modulation signal for detection in response to a relative speed of the target.

22. The radar apparatus according to claim 1, wherein
the signal processing section detects the frequency of the
25 differential signal between the high-frequency signal and the

reception signal considering a Doppler shift based on a relative speed of the target.